NEW NORTH AMERICAN MYXOMYCETES.

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The Myxomycetes described in this paper are in part new and hitherto undescribed species, and in part well marked and stable varieties of existing species.

Ophiotheca wrightii B. & C. var. **stipitata** n. var.

Sporangia stipitate, reniform, globose or ellipsoidal; stipes variable in height, sometimes mere plasmodic thickenings of the bases of the sporangia, sometimes attaining through intermediate grades a height of ·5 mm., slightly tapering from below upward, of medium thickness, black, and granulose or occasionally rugose on the surface; capillitium deep yellow, freely branched and combined to form a long loosely meshed net; threads provided with scattered short, sharp and either straight or slightly curved spines; spores yellow, 10–12μ in diameter delicately spinulose.

Fairmount Park, Philadelphia, Pa. (Harold Wingate.)

This very unusual and interesting variety is probably the first recorded instance of a stipitate species occurring in the Perichœnaceæ.

It differs from the typical form of the species in the presence of stipes, in the closer meshes of the net of the capillitium, and in the shorter spines on the threads of the capillitium.

The sporangia, however, excepting the stipes, are similar in every respect to the globose and reniform sporangia of the ordinary sessile form.

Arcyria magna n. sp.

Sporangia shortly stipitate, densely aggregated, growing either in small clusters or in large effused masses many square inches in area; individual sporangium elongated, cylindrical, tapering toward the end, evanescent above with a small, pale yellowish-gray, funnel-shaped permanent base or calyculus; inner surface of calyculus smooth, except very rarely a few scattered spinules are found under high amplification; stipes one mm. in height, tubular, the cavity being filled with rounded plasmodic masses; capillitium much elongated, about 12 mm. in length relaxed, drooping, tawny gray or drab in color, attached slightly by a few threads to the bottom of the calyculus, and forming a loose large-meshed network; threads of capillitium cylindrical, of uniform thickness, coarsely sculptured

with mingled half rings and blunt spines. Spores dull gray (not cinereous) in mass, colorless with reflected light, 7·5 to 8μ in diameter; epispores very thin showing under a high amplification from 10–12 isolated irregularly scattered hemispherical papillæ.

A. magna var. **rosea.**

Capillitium equally long as in the previous form, but less robust in habit and more cylindric in shape: color of capillitium and spores bright rose-red when recent; sculpturing of spores and capillitium like that of the previous form; calyculus smooth; spores 7·5μ in diameter.

Fairmount Park, Philadelphia, Pa.

The association of these two forms under one specific head is justified by the history of the species considered in connection with the fact of the essential accordance of the characters of the two forms in their totality.

The robust gray form was first found by the writer, growing separately. A few days later it was found again on the same log with clusters of the red form growing beside it. One month later in another locality about a mile from the first, an extraordinarily large growth of the gray form in large effused masses was found by Mr. H. Wingate, also associated in a similar manner with clusters of the red variety. In neither instance was there any intergrading of colors, nor did any of the clusters contain individuals of both colors. While these parallel histories might be considered as mere coincidences, the correspondence of all the essential specific characters of the two forms has led the writer to the belief of their specific connection at least, although not necessarily of their development from the same plasmodium.

This species is allied to *A. nutans* in the relaxed elongated capillitium, but differs from it in the sculpturing of the capillitium and calyculus. The capillitium-threads lack the minute vein-like reticulation which covers the interspaces between the coarser half rings and spines in *A. nutans*.

The calyculus of the red form is absolutely smooth except the longitudinal plications common to the eu-arcyriæ. In the gray form it is practically smooth, there being but a few isolated spinules on its inner surface. In *A. nutans*, however, the inner surface of the calyculus is covered with an exquisitely beautiful sculptured reticulation, coarse and venose below but grading above into a fine net with polyhedral meshes sometimes having spinous prolongations projecting inwardly from the intersections.

The peculiar spore warting of *A. magna* can be found with a high degree of amplification in *A. punicea*, *A. nutans* and several other species of the eu-arcyriæ. It may practically be considered the type of the spore-sculpturing of that section of the genus.

Trichia pulchella n. sp.

Sporangia substipitate or sessile with a narrow base, globose, averaging ·6 mm. in diameter, bright vitelline yellow, growing either singly or in small scattered clumps containing but few sporangia, but not upon a common hypothallus; sporangium-wall clear, translucent, rupturing irregularly at the top; capillitium and spores vitelline yellow in mass; capillitium composed of cylindrical threads 3·5–4·5μ in diameter, terminating in pointed ends from one to one and one half times the diameter of the thread in length; spirals three to four in number, winding more or less irregularly; interspiral filaments absent or very rudimentary; threads occasionally branched and having occasionally bulbous expansions in their course; spores 11 to 12·5μ in diameter; epispores provided with a sculptured reticulation composed of very narrow rounded thread-like raised bands combined into more or less broken polygons numbering from five to seven to the entire epispore.

Adirondack Mts., N. Y.—Chestnut Hill, Philadelphia, Pa.

This species is allied to the group of Trichias of which *T. chrysosperma* may be said to be the central form. It differs from them all however, in the solitary or individual habit of growth of the sporangia, which are not developed on a common hypothallus, and in the absence of interspiral ridges even under high amplification.

The very delicate thread-like character of the reticulations of the epispores is remarkable. The threads forming the sides of the polygons are sometimes simple, sometimes zigzag or broken in outline enclosing minute rhombic interspaces, or sometimes marked by a row of rudimentary pits like those often found in the epispores of *T. chrysosperma*. The spores of the two gatherings from which the species is described are identical, but the capillitium varies, being more bulbous and irregular in one gathering than in the other, due to the fact that it was developed in colder weather. In neither of the specimens could the sporangia be said to be stipitate, but the character of the dark plasmodic bases of the few subsessile sporangia, warrants the belief that under specially favorable conditions, stipitate sporangia may be developed analogous to those of the neighboring species *T. varia*, var. *nigripes*.

Comatricha typhina Roth. var. **heterospora** n. var.

Sporangia stipitate, cylindrical with rounded apex, or expanded above and terminating in a point curved to one side, about 2 mm. in height including stipes; sporangium-wall evanescent; capillitium composed of slender, sinuous threads arising from the columella, branched many times at irregular intervals and joined together forming a dense tangled network extending to the surface; spores purple-brown in mass when recent, fading in time, 5–6μ in diameter; epispore sculpturing complex and only evident with high amplification, consisting of about 10 to 12 dark violet colored hemispherical papillæ irregularly scattered over the surface between which may be found a delicate reticulation of narrow raised bands forming rhombic or irregular quadrilateral meshes.

New York, Pennsylvania, Virginia, North Carolina.

As this variety is seen in the herbarium, it resembles closely the usual form of *C. typhina*. There are however, well marked and positive differences. The capillitium is more slender and forms a denser network which is branched and combined to the very surface, giving the impression, without a close examination, of a parallel peripheral network. It is generally found also in small isolated clumps containing but a few closely aggregated individuals. In the spores of the typical form the larger scattered papillæ are also found but the intervening spore surface is not reticulated but very minutely verruculose.

This variety is not a mere sport or temporary variation, but occurs frequently and is constant in character, so that an observer familiar with it can always identify it in the field without difficulty. The spore sculpturing, however, is so evidently an evolution from that of the regular form of the species, that it seems to be entitled only to varietal distinction.

Diachæa thomasii. Proceedings of Acad. Nat. Sci. Phila., 1892, p. 329.

Plasmodium ochre yellow, immature sporangia pure white, mature sporangia metallic, either silvery or gold-bronze in lustre, sometimes iridescent, $\frac{1}{2}$ to $\frac{2}{3}$ of a mm. in diameter, scattered or grouped in clusters, stipitate or sessile, globose when stipitate but flattened at the base when sessile; stipes variable, usually short but sometimes $\frac{2}{3}$ of mm. in height, thick, rugose, dull ochre yellow containing lime; columella ochre-yellow, rough, penetrating from $\frac{1}{4}$ to $\frac{1}{2}$ the height of the sporangium, varying in shape from bluntly conical to cylindrical or cylindric-clavate, containing minute round or oblong ochre

colored granules of lime; spores pale brown 11–12μ in diameter; epispores sparsely covered with minute papillæ interspersed with a variable number of from four to eight large irregular dark violet papillæ apparently, which are resolved by sufficiently high amplification into dense clusters of from five to eight closely aggregated small papillæ; capillitium sparse, brown-violet in color, composed of rigid, straight, tapering threads arising from the columella and base of the sporangium, joined by a few lateral branches in the middle and near the ends into a loose open network; threads 3–7μ in thickness at the basal point of attachment, tapering to a point at their attachment to the sporangium-wall; hypothallus variable, usually membranous with scattered deposits of ochre-colored lime granules, but thick and crustaceous with lime when the sporangia are sessile.

Mitchell Co., North Carolina (Lancaster Thomas.)

This species and the two other distinctively North American species *D. splendens* Pk. and *D. subsessilis* Pk. are characterized by peculiarly specialized spore sculpturings, which would sufficiently serve to distinguish them from the cosmopolitan species *D. leucopoda*, even if their general characters were not equally well marked.

The spore markings of *D. thomasii* as given above, differ greatly from the others.

In *D. splendens* the epispores are studded with irregularly scattered, long, projecting columnar processes which are truncate or flat at the end, not spinose or rounded. These are sometimes joined at various angles forming elongated or angular bars.

In *D. subsessilis* the epispores are marked with diffusely branched rows of minute dark bead-like papillæ ranged side by side in a moniliform manner, sometimes terminating in free ends, sometimes running in a zig-zag irregular manner, but usually combined into a loose reticulation with large irregular meshes.

The epispores of *D. leucopoda* are delicately warted in a uniform manner, like those of many species of the Calcareæ and Stemonitaceæ.

Chondrioderma roanense n. sp.

Sporangia stipitate, discoidal, either circular or irregularly elliptical in outline, thin, flattened or slightly convex above, plane or plano-concave below, about one mm. in diameter when circular, or one by one-half mm. when elongated; upper surface of sporangia mottled, presenting the appearance of large irregular spots of dark umber joined by narrow bands of a paler brown color; under sur-

face dark umber shading to black in the center; sporangium-wall smooth, brittle, rupturing irregularly, basal fragments more or less permanently reflexed, apparently double, or at least composed of two easily separable layers; outer layer umber, mottled, colored by the innate granules of lime, inner layer pure white throughout except a narrow ring of pale umber brown around the columella, inner surface pitted with numerous minute indentations as with a needle point; columella flat, discoidal ·5 mm. in width, pale ochraceous color on surface; capillitium sparse, white or colorless composed of simple rarely forked sinuous threads, occasionally joined by lateral branches, attached below to the columella and adjoining portion of the basal sporangium-wall and above to the upper sporangium-wall; stipes variable, sometimes scarcely evident, sometimes one mm. high, black, longitudinally ridged, more or less flattened laterally according as the sporangium is elliptical or circular; spores dark violet 12–14μ in diameter, epispores thick, distinctly warted with sufficient amplification.

Roan Mt., Tennessee.

The affinities of this species are with the section of the genus represented by *C. radiatum*. It differs from the other discoidal or orbicular species in its dark chestnut umber color, its well marked discoidal columella and jet black irregular stipe.

Chondrioderma rugosum n. sp.

Plasmodium gray; sporangia grayish or dusky white becoming brownish at the margin of the base, shading into chestnut-brown around the point of insertion of the stipe; sporangia stipitate, nearly hemispherical, flattened and slightly umbilicate at the base, $\frac{1}{2}$ to $\frac{2}{3}$ mm. in diameter at the base; sporangium-wall single, papyraceous, much wrinkled or traversed by ridges which mark the lines of rupture and dehiscence and are combined so as to divide the wall into twenty-five to thirty shallow irregularly polyhedral portions which fall away on the scattering of the spores; stipes subulate, longitudinally rugose, brownish-black becoming brown above, one-half to two-thirds of a mm. in height; columella chalky or yellowish-white, clavate, much roughened in the upper portion, penetrating to one half the height of the sporangium; capillitium white or colorless, composed of simple tubules freely forked and combined by lateral branches into a loose network attached to the columella and basal wall of sporangium below and the upper sporangium-wall above; spores 10μ in diameter, warted, violet-brown in color.

Cranberry, North Carolina (Lancaster Thomas.)

This species is also allied to *C. radiatum*. The ridges which cause the peculiar shrivelled appearance of the surface of the sporangia are not the result of the drying of immature sporangia, but are present in all cases. They are morphological in character, their location being indicated by grayish lines on the chalky white surface of the immature sporangia from a very early period of their development while they are still in a soft and plump condition.

Craterium rubescens n. sp.

Sporangia stipitate, about one mm. high including stipe, cylindroid or elongated cyatbiform, apex convex; sporangium-wall single, dark violet-red, smooth except at the upper portion which is slightly roughened by an external deposit of scattered lime granules of a pale lilac color; lower third of wall ridged longitudinally; on spore dehiscence the apex falls away separating by an irregular line in a circumscissile manner; stipe violet-black, one-half the height of the sporangium, wrinkled longitudinally, the ridges being continuous with those upon the sporangium; capillitium composed of an irregular, branched central mass of violet-red lime granules, the branches connected with the sporangium-wall either directly or by a scanty network of delicate colorless tubules with long angular knots of red lime granules at the nodes; spores 7·5–8·5μ in diameter, brown-violet, epispores thick, minutely warted with dark violet warts.

Louisiana (A. B. Langlois, com. J. B. Ellis.)

This species is allied to both *C. aureum* and *C. leucocephalum*, more especially in their elongated and cylindroid forms. It is distinguished from them by the Badhamia-like character of the capillitium and by the color which exhibits some shade or tone of red or violet-red in every part of its structure. The color of the sporangium-wall is due largely to the violet-red innate lime granules which it contains.

Craterium concinnum n. sp.

Sporangia usually minute, stipitate, broadly funnel shaped, one-half to two-thirds of a mm. in height including stipe, and one-fifth to one-half of a mm. wide at the top, dehiscing by a regular cap or operculum; color variable, sometimes light or dark umber uniformly diffused over the entire sporangium, sometimes dark brown on the lower half of the sporangium, abruptly shading into brownish-white

in the upper half, operculum brownish-white, darkest in the center; operculum always more or less convex, rarely approaching a hemispherical shape; sporangium-wall smooth, simple, variously colored by the innate lime granules; stipe equalling the sporangium in length, dark brown, longitudinally ridged; capillitium composed of a close meshed, all-sided network with small rounded or slightly angular nodal masses of ochre brown lime granules, averaging about 25–30μ in diameter; no true columella, but the central nodes larger than the others; spores 9–10μ, brown, delicately warted.

Fairmount Park, Philadelphia, Pa.

This species differs from the various forms of *Craterium vulgare* to which it is most nearly allied, by its habit of growth, its generally different shape, its convex operculum and especially by the very different capillitium with its minute nodes which are invariably of a dull brownish-ochre color. Like *Lachnobolus globosus* with which this species is frequently associated, it is usually found upon chestnut burs lying upon the ground in moist places.

Physarum variabile n. sp.

Sporangia scattered, stipitate, substipitate or sessile, about one mm. high; regularly or irregularly globose, ellipsoidal, obovate or cylindric-clavate in shape; sporangium-wall sometimes apparently thick, of a dingy yellow or brownish-ochre color, slightly rugulose on surface, crustaceous, brittle, rupturing irregularly, sometimes thin, translucent covered externally with flat circular lime masses falling away in patches; stipes nearly equal, occasionally much expanded at the base, rough, longitudinally rugose, variable in size, sometimes one-third of a mm. high, sometimes a mere plasmodic thickening of the base of the sporangium; color of stipes varying from a yellowish-white to a dull brownish-gray; capillitium a small meshed network of delicate colorless tubules with large many-angled rounded masses of white or rarely yellowish-white lime granules at the nodes; no true columella but often a central irregular mass of white lime granules; spores dark violet-brown, verruculose 9–10μ in diameter.

Adirondack Mts., New York.

A comparison of several gatherings of this species shows a great diversity of forms, the most curious of which is the erect, subsessile cylindroid form. Nevertheless the essential characters are the same in all, making them referable to one species. The crustaceous semi-glazed sporangium-wall and similar capillitium ally this species

to *P. citrinellum* Pk. most nearly. It differs from the various forms of *P. schumacheri* Rost. in the absence of a columella.

Badhamia orbiculata n. sp.

Sporangia stipitate or sessile, orbicular, discoidal, irregularly elongated or plasmodiocarpous; averaging about one mm. when simple but of larger size when plasmodiocarpous; when stipitate flattened or depressed above and plane or slightly umbilicate below; sporangium-wall single, more or less translucent from the varying number of innate lime granules; external surface sometimes covered with scattered flat circular masses of lime granules, gray in color except a small area about the attachment of the stipe which is dark brown; inner surface also gray except an area of brown becoming brown-black in the center of the base; stipes short, ·3mm. high, deep black, rough, ridged longitudinally; capillitium composed of an irregular central network of tubules containing white lime granules, attached above and below by slender straight sometimes forked tubules, to the sporangium-wall; spores 14–16μ in diameter, dark brown, warted under high amplification.

Fairmount Park, Philadelphia, Pa.—Nebraska (H. Webber) Ohio (A. P. Morgan.)

The discoidal character of the simple sporangia of this species is constant and there is but rarely, in any form, any noticeable degree of convexity of the upper surface; on the contrary some sporangia exhibit a somewhat double concave surface, the upper and lower walls nearly coalescing in the center.